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INTEGRATING COMMERCIAL ELECTRONIC EQUIPMENT TO IMPROVE MILITARY CAPABILITIES

by

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Preface

The use of personal electronic items in the military environment has continued to escalate in the last few years. The focus of this paper is to bring to light some of the issues that surround this emerging technology and suggest a direction for the integration of personal electronics in the military workplace.

I chose this topic for research based on my experiences as a crewmember of an S-3B Viking and as the Maintenance Officer of a VS squadron. In carrying out my duties I witnessed the use of commercial electronics in day to day operations both on the ship and in the air. I was troubled however, that there was no "integration" of this technology. Some people had it, some knew how to use it, but the majority of my contemporaries were unaware of what was available to enhance mission effectiveness. As the next millennium approaches and the services proceed toward Joint Vision 2010, I suggest that we should establish a process for surveying, adapting, appropriating and distributing commercially available technological devices to our service members and train them on their effective operation.

I would like to thank CDR Albert L. St. Clair, who as my faculty advisor, provided beneficial guidance and kept my focus on the "big picture" and special thanks to my wife, Judy and sons David and Sam who provided much needed moral support.

Abstract

There is a new information revolution brewing. Hand held electronic devices are invading the home and the workplace. As capabilities increase, the cost of commercially available personal electronic devices continues to decline dramatically. These devices include Personal Data Assistants (PDAs), Cellular Phones, Pagers, GPS receivers, and Digital imaging equipment. The military should plan for the integration and use of these devices to enhance effectiveness of operations. By designing open architecture systems that are upgrade capable, the military can take advantage of emerging technologies. There are issues to be considered: integration, reliability, training, security and invasion of privacy.

This paper contains research from recent monthly publications, and other hard copy sources, but I have included many Internet sources focusing on the increasing use of these devices in the private sector. Based on this research I will suggest a process for improving how the military can better integrate these appliances into our existing culture.

Regardless of how one feels about the headlong technological rush into the future, the “genie is out of the bottle” and the pace will only increase as we take our first steps in the next century. We should start planning now for how we will use these new devices in the future to promote mission effectiveness.

Chapter 1

Commercially Available Personal Electronic Devices

Technology involves how to make the universe work for you; science is learning why the universe works.

—K. Eric Drexler

There is a new technological revolution coming. In fact it already came and few may have noticed. But don't worry, there is sure to be another one any day now. The revolution that this paper will focus on however, is the use of commercially available personal electronic devices in the private sector and how we can better integrate them into our military culture. It is not the intent of this research to explain how these devices work or the technology that supports them. While understanding the science and technology is important, the question this paper will address is: "How do we go about improving the process to integrate emerging technology in the military environment." For this discussion I will focus on Personal Data Assistants (PDA's), cellular communications, (cell phones), electronic paging devices, (pagers), Global Positioning System Receivers (GPS's) and digital imaging equipment. Following are four scenarios to give the reader a flavor for the scope of the opportunities and to provide a framework for further the discussion of effective integration of these devices. First, a few explanations may be required.

Architecture in the sense of computers and electronics can refer to hardware, software, or a combination of both. The architecture of a system determines its capabilities. An open architecture allows the system to be connected easily to other devices and programs. An open architecture system will use off-the-shelf components that conform to an approved standard. A system with a closed architecture, on the other hand, is one whose design is proprietary, making it difficult to connect the system to other systems.[1]

E-mail, short for **e**lectronic mail, is the transmission of messages over communications networks. Online services and Internet Service Providers (ISPs) offer E-mail, and emerging standards are simplifying exchange of mail with users of other systems. More than just traditional messages, E-mail can be used to transfer data, programs, images and more.

Downloading, uploading, and synching are all terms used to describe moving data from one device to another device. This can be done with hardware via a cable connected to a serial port, via a modem over telephone lines or radio, or by infrared data link. In the case of infrared the transmitter and receiver must be close enough to "see" each other (3 feet for 16 MB per second transfer rate) to effect conductivity.[2]

Embedded microchips power most of the devices that you use routinely. Power windows, fuel injection for your car, your microwave oven, and video games all use embedded chips as opposed to PC microchips.[3] The 64-bit processors that run video games today were used to run complex computer aided design (CAD) and computer aided manufacturing (CAM) programs five years ago.[4] Competition among manufacturers will continue to drive down price and increase capability.[5]

Next, we will use our imaginations to explore some possibilities. The following scenarios were designed to incorporate a broad range of capabilities that may exist in the near future. While reading through them, think not so much of the technology, but of the change to the military culture that the technology might impose.

Advance Technology Scenarios

Logistics and Personnel at the Front

The platoon sergeant surveys his squad leaders and generates a list of supplies needed for his platoon on his Personal Data Assistant (PDA). The logistic program on the PDA consolidates and prioritizes the inputs. At the designated time he "uploads" his data to the company's executive officer via PDA as well. Once the XO consolidates all requests, the data is squirted via wireless modem to the battalion S4 who now can now rapidly allocate supplies as needed to fielded forces. The platoon sergeant's PDA contains pertinent information about all members of the platoon including blood type, necessary medical information, next of kin and other administrative data enabling him to have access to a file cabinet's amount of data in the palm of his hand. The durable and rugged device can work for two weeks on just two AAA batteries and has a built in data security system to only allow authorized access. The platoon leader on the other hand uses his PDA for downloading additional mission data from battalion HQ. Using graphical readouts he can readily ascertain the disposition of his troops via their GPS oriented beacons in relationship to hostile forces in the area. After receiving orders from his company commander via E-mail, he acknowledges and proceeds to brief his men.

PDAs and Digital Images at Sea

While in support of an embargo enforcement mission the pilot of an aircraft flying reconnaissance spots a suspected smuggler. Using a digital camera that can interface with the open architecture of his aircraft, he records a still shot. The camera has built in zoom and image stabilization circuits that allow for a clear image while minimizing the time the aircraft remains in the threat envelope. Satisfied with the image, the pilot sends the data (complete with image, location, course and speed of contact information) via secure channel back to the ship's Combat Information Center over the aircraft's more powerful transmitter. There the image is studied and a decision made for a picket ship to intercept the identified smuggler before the aircraft lands. After the flight and post flight responsibilities are completed the pilot returns the digital camera to the ready room and attends a department head meeting. During the meeting, he is tasked with an evolution requiring the effort of several individuals and inputs from several resources. He quickly organizes his notes, schedules several "To Do" items and identifies delegable task for his division officers. Minutes later, meeting with his division officers, the pilot is able to "download" the data to their PDAs and an agreed schedule for the completion of the project is determined.

Marines on patrol

Carrying rifles as well as PDA, Marines on patrol conducting MOOTW missions in urban environments can stay in constant touch with HQ. The PDA combined with the cellular modems allows two-way transmission of critical data including access to building data, infrastructure blueprints, and other civic information that may assist the Marines in carrying out their duties. Images (like mug shots of suspected fugitives) can

be recorded and a database of potential terrorist accessed from the field. Reports can be filed from the field in real time, giving civilian authorities a better picture on the emerging environment.[6]

Airborne Troubleshooting

The flight engineer (FE) aboard a C-17 flying to Saudi Arabia discovers a hydraulic malfunction. Plugging his PDA into a nearby terminal he contacts civilian engineers in CONUS for consultation. They request a digital photo of the malfunctioning equipment and the FE obliges. After determining the cause of the trouble by looking at the graphical image and other system readouts that were transmitted as well, the contractors advise the FE on how to effect a temporary repair and ship the necessary parts to fix the malfunction out before the C-17 has even landed. Meanwhile the FE completes his task and finishes the paperwork on his PDA and uploads the details of the maintenance action back to home station where Maintenance Control updates the status of the aircraft 4,000 miles away.

Examples of Emerging Technology

The above scenarios, while seeming a bit fantastic, are well within our technological grasp in the next few years. The ways that the military can adapt these devices to many purposes have not been completely explored.

While not an exhaustive or complete survey, it is prudent now to discuss in more detail the technology that is the focus of this paper. I have included images of the devices for reference. While reading the text, look at the structure and shape of these appliances.

If form does indeed follow function, it would seem that there is a concurrence in industry about how these items will look.

Personal Data Assistants

They started out as electronic organizers, day planners with batteries. They have evolved to be much more however, with the ability to be programmed to run application software. Presently, there exist two main categories, those with keyboards for data entry and those without. There are PDAs with color and monochrome (green) screens, built in modems and external links to regular cellular phones. The most rugged units that currently have the predominant share of the PDA market are the smaller and compact types.[7] There are many entries in this category. 3Com has a popular unit called the Palm Pilot. Other companies have introduced similar units that have a Microsoft Windows based operating system. One thing that they all share is the ability to upload and download information from a personal computer. Other common features found on PDAs: Address Book, Date Book, Memo Pad, To Do List, Task Scheduler, Expense Tracker, Calculator, etc. Additionally, most are able to run user defined programs and dedicated application software. PDAs that run Windows CE have light versions of familiar word processors, spreadsheets, E-mail, Web browsers, fax software and presentation players.[8] In other words, a PDA is like a computer in your hand. Although limited in speed, memory capacity and functionality with respect to your average PC, PDAs are catching up fast. Using embedded chip technology, a lot of the functions that are associated with desktop PC will be migrating toward appliance electronics.

Source*: Left:* Newton ThinkPad,[9] *Middle:* Palm Pilot,[10]; *Right:* Casio E-10,[11]

Figure 1. Personal Data Assistants

On the left side of figure 1 on the preceding page is a Newton Think Pad that can link data to Apple computers. A Police department in Largo, Florida allows their officers direct access to critical information without the aid of a dispatcher using the Apple PDA connected via modems to an Internet Web browser.[12] Dependability and reliability are requirements for police as well as military and these PDA performed well in 98 degree temperatures and 90 percent humidity.[13] In the middle of figure 1 is a Palm Pilot resting in the cradle that allows it to exchange data via a serial port with a host computer. The third image is that of a PDA that uses an operating system called Windows CE. As the variety and complexity of these devices expands, the marketplace will likely choose the victor in terms of affordability, capability, and ease of use. The underlying principal though, is that it does not matter which particular unit wins the race. The new standard is the Internet and the next generation of PDA's must be able to exchange information in such a way that that is indifferent to operating system or software. Chapter 4 of this paper will discuss developing trends in the technological arena. Table 1 is a summary of data gathered from the article by Michael Lasky and Harry McCracken entitled "Palmtop PCs Grow Up."[14] Although, for the purposes of this paper I limited myself to PDAs

without keyboards, there are many devices that are scaled down versions of laptops made by companies like Compaq, NEC, and Philips. While these bigger devices are more like the traditional desktop PC, they lack the ruggedness and compactness of the other units. The information in table 1 is to demonstrate a comparison of capabilities only. I am not endorsing any particular product, and new functions and capabilities are being presented daily. Competition in the marketplace is driving companies to out perform each other at a breakneck pace.

Table 1. Comparison of PDA without keyboards[15]

PDA	Price (Oct98)	Operating System	Memory Size	Modem Capable	Battery Life
Palm Pilot	$399	PalmOS 3.0	2 MB	Yes	30+ hours
Casio E-10	$399	Windows CE	4 MB	Yes	5-10 hours
Everex A-15	$399	Windows CE	8 MB	Yes	5-10 hours
Sharp SE-300	$180	Proprietary	1 MB	No	20+ hours

Cellular Communication: Phones and Pagers

A walkie-talkie on steroids, the cellular phone has become much more than a novelty used by VIP's. These devices extend the capabilities of a tool we are very comfortable with, the telephone, and make it mobile. Prices continue to fall while range, reliability and capability increase, but there have been problems with cellular phones. Their introduction into our everyday lives has outpaced our ability to define how and where they should be used in our society. From distracted motorists talking on their cellular phones that cause accidents to the invasion of privacy perpetrated by people holding private conversations over their cellular phones in public, there has been a change in our

culture due to advancing technology.[16] It seems that our society has not kept up with the advances in technology in regards to etiquette and disposition. The military, as a reflection of our society, may have the same problem.

Figure 2. Cellular Phone[17] and Pager[18]

Pagers are relatively old technology that allows people to stay in touch. Improvements include alphanumeric screens and improved area coverage. By receiving a message these devices are approaching the E-mail domain of PDA's. Various converging technologies are greatly increasing the capabilities of all of these devices, so much so that they begin to blur into each other. New cellular phones have pagers built in to alert users to incoming calls and to turn their phones on.

Global Positioning System Receivers

GPS's provide an incredibly accurate navigation system in a box. Civilian versions of these devices have been used in the military for applications as diverse as a foot soldier doing reconnaissance to military aircraft for position updates. The exciting aspect is the absorption of this technology into PDA and wireless communications. As will be discussed in chapter 3, in the near future, not only will you know where you are, but you

also will be able to transmit your location to friendly forces. On the left side of figure 4 is a Garmin GPS. Although accuracy can be off as much as 300 feet for civilian version due to U.S. government security concerns, the military can achieve higher accuracy as required.[19]

Figure 3. Global Positioning System Receiver[20] and Digital Cameras[21]

Digital Imaging Equipment

Affordable digital imaging equipment is becoming more common. Figure 3 middle and right images are examples of popular digital cameras. The quality of digital cameras continues to improve. The so-called "mega-pixel" cameras have resolution approaching that of film cameras.[22] The benefit to the military is that these images can be transmitted and readily manipulated for intelligence, Battle Damage Assessment (BDA), personnel identification and a host of other purposes. Digital video cameras, which costs around $2,500 today, run on microchips that together only cost some $227. During the next several years, chips that can run 400 gops (giga-operations per second) will allow higher resolution digital images and high-speed data transfer between devices.[23]

Notes

[1] Internet: http://www.webopedia.com

[2] Lee Goldberg. "16-Mbits/s IR Data Link Speed PDA, Camera Transfers," *Electronic Design*, Vol. 46, Issue 23, (Oct 98):p23

[3] Clint Willis. "25 Cool Things You Wish You Had…and Will," *Forbes*, Vol. 161, Issue 11, (Jun 98):p50

[4] Ibid.

[5] Ibid.

[6] Michael Keenan. "PDAs solve the crime," *Communications News*, Vol. 36, Issue 1, (Jan 99):p46-49

[7] Bob Emmerson. "Cross my palm with a PDA," *Communications International*, Vol. 25, Issue 9, (Sep 98):p40-41

[8] Michael Lasky, Harry McCracken. "Palmtop PCs grow up," *PC World*, Vol. 16, Issue 10, (Oct 98): p143

[9] Internet: http://www.htex.com/gps/index.html

[10] Internet: http://www.3com.com/palm_pilot/index.html

[11] Internet: http://www.casio_usa.com/hpcle_10.cfm

[12] Keennan, 46

[13] Ibid.

[14] Michael Lasky, Harry McCracken. "Palmtop PCs Grow Up," *PC World*, Vol. 16, Issue 10, (Oct 98): p145.

[15] Ibid., 145-9

[16] Dave Lammers, "In Japan, Intranets Spawn a Communications Culture," *Electronic Engineering Times*, Issue 908, (Jul 96):p33

[17] Internet: http://www.craigofficesupply.com/cell.html

[18] Internet: http://www.stevessecurity.com/alphanumeric_paging.htm

[19] "Where I'm Calling From," *Fortune*, *Technology Buyers Guide Supplement*, (Winter 99): p34

[20] Internet: http://nvlt.com/gps12.htm

[21] Internet: http://www.supremevideo.com/digital_camera/digmain.htm

[22] Gene Wang. "The Future of Digital Cameras," *Web Techniques*, Vol. 3, Issue 9, (Sep 98): p44

[23] Clint Willis; p49

Chapter 2

Consumer Technology Issues for the Military

Tell me what you need, and I'll tell you how to get along without it.

—Dilbert

It might seem like there is an endless parade of new technology thrown at the services each year. We are still getting our arms around desktop and laptop PCs in the workplace. Security of data, copyright protection of software, trying to keep up with the latest hardware and software are admittedly ongoing battles. But few would argue that the use of PCs in the military has been detrimental. They allow us more flexibility, increased productivity and greater connectivity than ever before. Similarly, the introduction of PDAs and wireless communication into our culture will not come without some chagrin.

Integration

The proliferation of formats and protocols within the computer industry has burgeoned in the last year. Things that are supposed to represent a "standard" can come and go quickly. For example, Hyper Text Markup Language (HTML) is supposed to be the standard interface for posting items on the Internet. A newer web based publishing processing system called Extensible Markup Language (XML) is opening the door to newer devices including palmtops and PDAs. "The Web is guilty of having a new

revolution every 15 minutes. I hesitate to predict that XML will take over the world, but it does make a lot of sense," says Steve Frankel, managing director at Adams, Harkness & Hill.[1] Java, a web based programming language is compatible with HTML, but it has also created disruption on the Internet with not all browsers being able to recognize Java's protocols.[2] Java was originally developed by Sun Microsystems for handheld devices and set-top boxes.[3]

We must insure that technology we invest in meets globally recognized standards. With our forces operating all over the world, the ability to access and distribute data and images must not be constrained due to artificial protocols or proprietary operating systems. We, as the military, have the opportunity now to have influence on those standards as they are being formed.

Reliability

Reliability, dependability, and field-tested are all ways to describe the requirement for tough, damage resistant hardware. Our fielded forces work in some of the harshest environments on the planet. From the flight deck of an aircraft carrier to the hot sands of the world's deserts, our gear has got to be durable. Intentional or accidental electromagnetic pulses (EMP) can destroy electronic circuits or cause data loss. Unfortunately, all requirements, including military standard reliability have a cost. I propose that in the acquisition of emerging personal electronic devices, it is better to have redundancy rather than no-fail quality equipment. The PDA that I used during my last deployment survived in the leg pocket of my flight suit for over 150 catapult takeoffs and arrested landings without failure. It was subjected to electromagnetic radiation in the ship environment without loss of data, and even got dropped once in a while. Essentially,

I am suggesting that the consumer standard is good enough for non-mission critical uses of these devices. Although, they may not last for years, the technology advances will quickly make them obsolete. It is better to design our information systems with redundancy and easy hardware replacement, than to construct a process that expects no failure of equipment to work properly. PDAs can achieve this now. The host computer maintains a separate file for each user. If a PDA is lost or destroyed, a new one can be synchronized with the host and a data download performed.

Cost

I am not suggesting at this time that the government supply each service member with a PDA. Although a few (a happy few) own and use one already in our daily work, the technology is still in its infancy. There may be a time in the near future though, when it might make sense for the military to invest in some of this equipment. In determining the cost of acquiring new technology into the military, one must also be cognizant of the impact that training, maintenance (man-hours plus parts) and supply has on the system. All of these devices rely on batteries and utilization rates can be high. Use of standard batteries will alleviate some problems with the supply system, but you don't want to diminish mission effectiveness due to lack of a battery.

Maintenance can be handled by the manufacture for equipment under warranty (security considerations are discussed later), and supplies of parts and accessories could be arranged under existing military procurement channels.

Training

With these devices, training is currently accomplished with On the Job Training (OJT). If more service members used them with dedicated programs created for military applications, it would require additional resources be spent on training users.

One of the challenges in developing training for using advanced technology is the vary degrees of "technological literacy" within our society. To loosely quote the actor Billy Crystal in the movie *City Slickers,* "The cows will be able to program a VCR before he does…" In other words, some will read the manual, learn all of the functions and discover how to use a device's full capabilities. For others, getting past the On/Off switch will be a formidable task. Training for using these appliances should be left at the unit level. Theses front line commands will best know what operations they want the equipment to perform and how best to encourage personnel on how to use the devices. Although, this approach will consume man-hours, one of the key motivators behind the technology is that it saves time and allows performing tasks more effectively. So, the time spent on training personnel should be considered as an investment.

Security

Security of data, and force protection are primary concerns when it comes to the military and these new technologies. The military faces unique hazards compared to the commercial sector in that no one will shoot at you for being in the wrong place (well, sometimes, it depends where you live). Any electronic device is a transmitter of sorts. A microchip that acts like a clock tells the rest of the hardware when to perform. With speeds in the megahertz range, these devices can emit traceable signals.[4] Wireless communication is always risky. Cellular communications are a common source of

information, according to security consultants and hackers.[5] Last year there were over $17 million in losses due to telecommunications fraud including eavesdropping and illegal use of cellular phones.[6] Even with encrypted data, there is the danger of signal interception and location detection. The identification and location of cell phones of all types (digital, analog) is now possible with the latest broadband direction finding equipment.[7] Careful consideration must be given to the enemy's capabilities and weaknesses of our communication systems to avoid compromise. It would obviously be bad to issue a device to your men that should help them accomplish their mission only to find out that it helps potential enemies to target friendly forces.

Privacy

To some, being connected to the world twenty-four hours a day, seven days a week sounds like paradise. But to most of us, it sounds a little like torture. No one wants to be bothered during off duty hours, or to be called in from leave early. With instant and constant connectivity, what cultural changes must take place to retain individual prerogative?

With abundant computing power in the palm of their hand, anyone can upload and have access to sensitive personal information or endanger personnel with mission essential information. The systems used must be able to safeguard against these threats. Our society and our military culture must strictly define and defend access to data.

Notes

[1] Blaise Zerega. "Adams, Harkness & Hill Banks on XML Technology," *Infoworld*, Vol. 20 Issue 44, (Nov 98): p70.

[2] Internet: http://www.webopedia.com

Notes

[3] Ibid
[4] Deborah Radcliff. “Who’s Listening In,” *Industry Week*, Vol. 247, Issue 10, p12
[5] Ibid, p13
[6] Ibid
[7]Clarence Robinson Jr. “Position-Fixing Methods Use Broadband Direction Finders,” *Signal*, (Oct 98), Vol. 53, Issue 2, p71.

Chapter 3

The Near Future in Consumer Electronics

The gift of fantasy has meant more to me than my talent for absorbing positive knowledge.

—Albert Einstein

International Business Machines has recently started producing chips using silicon germanium technology for use in wireless devices such as cell phones, PDAs and GPS receivers.[1] These new semiconductors promise lower cost, lower power consumption and cleaner electronic signals (very important with digital systems) than the older gallium arsenide technology.

Palm Computing, Inc., a 3Com company, announced in December 1998 a new product called the Palm VII. The Palm VII organizer will enable users to:

> Quickly, easily and securely obtain information from web and Intranet sites via a wireless connection to the Internet and will provide a means of instant two-way personal communication. In addition to providing fast and simple access to personal and business information, the Palm VII organizer will give people a wireless means of quickly finding important Internet information such as flight schedules and news headlines, and conducting online transactions such as movie ticket purchases or online stock trades…[2]

This device has achieved several significant technological advancements, including fast wireless Internet messaging, built-in security, and will work several weeks on just two AAA batteries. 3Com has also recently introduced a new model for accessing Internet information, called “web clipping.” Web clipping is a means of extracting only a

specific set of needed information from a given web site, eliminating the superfluous data on a web site. Referring to the scenarios presented in chapter 1, it is easy to see that the "future" may be already upon us.

Although most of the lower priced and popular PDAs, cellular phones, pagers, and GPS receivers use monochrome LED screens, color screens like those available on digital camera are likely to converge on new models. The price for color screens is prohibitive currently, but as the technology advances and increasing production provides economy of scale, we will see more versions of emerging technology incorporate color LCD displays. Another drawback to PDAs, cellular phones and associated devices is in the input of data. Table 2 displays the time required to input two quotes totaling 50 words into several different PDAs and a desktop.

Table 2. Average Time to Input Data[3]

SYSTEM	Average Time in Seconds
Desktop PC (standard keyboard)	50
NEC MobilePro 750C (9.6-inch keyboard)	57
Psion Series 5 (6.5-inch keyboard)	80
Casio Cassiopeia E-10 (Jot character recognition)	186
3Com Palm III (Graffiti character recognition)	197

For PDAs to become more effective, alternate methods for data entry like virtual keyboards, or voice recognition programs will be helpful. Improving input, output, storage capacity, and power usage are projects being tackled around the globe. Global cellular connectivity and mobile satellite systems are bridging the gap between PDA and host computer databases.

The predominant digital cameras today use charge-coupled devices (CCDs). In the future, they will most likely utilize complementary metal oxide semiconductor (CMOS) sensors that cost less and use less power.[4] Soon, digital cameras will possess two million pixels that will produce output that rivals traditional film cameras.[5]

In summary, there is a convergence in all aspects of the electronic industry that will come to fruition in the very near future. Completion of wireless data networks, companies acquiring other companies and their technology to incorporate into their products and massive investment into the concept of mobile computing indicate a new horizon in how we as the military should look at information technology.

Notes

[1] *Internetweek*, (Oct 98), Issue 737, p37.
[2] Internet: http://www.3com.com/palm_pilot/index.html
[3] Michael Lasky, Harry McCracken. "Palmtop PCs Grow Up," *PC World*, Vol. 16, Issue 10, (Oct 98): p146
[4] Gene Wang. "The Future of Digital Cameras," *Web Techniques*, Vol. 3, Issue 9, (Sep 98): p44
[5] Ibid, p45

Chapter 4

Integrating Consumer Electronics into the Military

If you tell people where to go, but not how to get there, you'll be amazed at the results.

—Gen George S. Patton

Surveying

The Internet is full of late breaking news of the latest gizmo or high tech do-dad. How do we separate the wheat from the chaff? The military does not have the money to invest in every model of every new computing or communication marvel that comes down the road, nor should they. Additionally, once a device has been found that is valuable to mission effectiveness, will it be embraced by all of the services? The Navy and Air Force have initiatives and programs to institute information technology standards within their own services, but there is not necessarily any coordination between the two branches.

I suggest that a Joint Committee be established that has as its mission to survey new technologies with applicability to services roles and functions. This committee should be headed by a senior officer, but be composed of junior officers and junior enlisted personnel who more strongly identify themselves with new technology. These junior personnel should be aware of current mission needs at the operational level and how new

technology can help. This committee would produce a report establishing standards, informing the services of product capabilities and making recommendations for procurement where applicable. In doing so, the military can help shape the environment of future devices in much the same way that business influenced the evolution of personal computers.

Adapting

Having identified promising equipment and providing structure for its use within the military environment, a "Lessons Learned" databank can be established. A web site dedicated to distributing this data (properly secured) would contain ways of adapting these appliances to military requirements. The experience the services went through with the introduction of the PC into the workplace should provide a starting point. There are things that we are still learning as we integrate the PC into our service culture. The mobility and power of PDAs with communication capabilities will be an order of magnitude greater than the PC in how they cause us to adjust.

Appropriating and distributing

Initially, I do not suggest that we go out and buy a PDA or cell phone for every service member. Those that know how to use and need these devices probably already have one. But, after notable equipment has been identified, funds should be made available for selected units to purchase and integrate the device into their mission. Guidelines need to be set up that determine minimum standards for interoperability, reliability, cost and security before the purchased can be reimbursed. In this way we can diversify the risk of putting all of our money into one technological "basket."

Filter Down Technology

In my admittedly limited experience in the Navy, newer, faster and more capable equipment distributed the traditional way had a tendency of winding up in places where it looked good, but was not used (just a very expensive paperweight). Then as the next generation of technology hits the streets, the old equipment "filters down" to the next level where it might have actually been useful. We must endeavor to get the equipment to the personnel who need it as soon as possible. Then, as newer devices are introduced, a better method of redistributing the old equipment must be found. By distributing the acquisition of this equipment to the individual unit, we stand a better chance of them getting the right kind and right amount of new technology to help them conduct their mission.

Leadership is still Important

This new technology can be useful, but it can also become a barrier to effective communications. An over reliance on E-mail, or what one of my previous skippers called "over the horizon tasking," can lead to bad leadership habits. The technology that I have discussed in this paper is supposed to allow us to be more effective and efficient. Ideally, that gives us more time to the important stuff, like lead from the front. When you are not tied to your desk because you have a mobile computer in your palm and therefore access to information and personnel, you should be able to get out among your troops and lead. No technology can replace actual presence to motivate, encourage and support each other.

Chapter 5

Conclusions

There is one thing stronger than all the armies in the world, and that is an idea whose time as come.

—Victor Hugo

As discussed in the chapter 3, wave after wave of technological advances seems to overwhelm us, but it is not technology that we should fear. As stated by Major Kurt Hall, USAF "Knowledge is not power, it only represents potential. The application of knowledge is power." The devices discussed in this paper: PDAs, cell phones, pagers, GPS receivers and digital imaging equipment are tools that will be available to enhance our ability to achieve mission success by applying and disseminating knowledge and information.

The essential aspect of these emerging technologies is that they allow access to information and other people from where you are working, not from where the computers and telephones are located. Automobiles and commercial aircraft will soon have greater access to the Internet. There are even refrigerators that have a input touch panel and display screen that allows the user access to E-mail and watch recipes being cooked! By leveraging new technologies, we can empower military personnel to become more effective regardless of whether they are in a leadership position or if they are new to the services. Nearly instant access to information promises unrealized benefits in thousands

of facets of how we protect our country. By putting this power into the palm of their hand, they are free to go where they are needed, where the work is and not tied to a desk.

Our traditional enemies as well as new threats to our security will also have access to these emerging technologies. They will surely attempt to use it against us or deny our exploitation of the technology. There will be logistical, security and training related challenges integrating this new technology into our service culture, but we really have no choice but to move forward.

On the battlefield, we will still need to know how to win the war with our aircraft, tanks, guns and ships. However, not all of our careers are spent on the battlefield. We spend a large percentage of our time in the pursuit of the mundane but important jobs (maintenance related paperwork, ordering supplies, collecting data for reports, and distributing information) the very tasks these high tech gadgets were engineered to improve. How we integrate (or fail to utilize) these appliances into the military environment may not determine the outcome of a battle. They may however, at a minimum, reduce wasted manpower and allow more time for training for battle. In the emerging strategic environment of the next century that probably will involve more MOOTW, urban warfare, austere budgets and limited manpower, we owe it to our country to wisely plan and invest in the coming technological revolution of personal electronic equipment.

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